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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,387	02/26/2004	Lei Shao	42P16330	4947
59796 7590 04/20/2007 INTEL CORPORATION c/o INTELLEVATE, LLC P.O. BOX 52050 MINNEAPOLIS, MN 55402			EXAMINER NGUYEN, LEON VIET Q	
			ART UNIT	PAPER NUMBER
			2611	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/20/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/789,387	<b>Applicant(s)</b> SHAO ET AL.	
	<b>Examiner</b> Leon-Viet Q. Nguyen	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 August 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

1. Claim 8 is objected to because of the following informalities:
  - a. In claim 8, there should be a comma after communications device.

Appropriate correction is required.

### *Double Patenting*

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. **Claim 1 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of**

**compending Application No. 10/788657. Although the conflicting claims are not identical, they are not patentably distinct from each other.**

Re claim 1, "receiving content for transmission via a multicarrier wireless communication channel" is the same as "receiving content for transmission from a plurality of transmit antennae" and "generating a rate-one, space-frequency code matrix from the received content for transmission on the multicarrier wireless communication channel from a plurality of transmit antennae" is the same as "generating a rate-one, space-frequency code matrix from the received content for transmission via the plurality of transmit antennae" in compending Application No. 10/788657.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

4. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

**5. Claims 2-22 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 2-22 of compending Application No. 10/788657.**

**This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.**

***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. **Claim 8 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

Claim 8 pertains solely to instructions that are not embodied in any computer-readable media or machine-readable media.

*"Similarly, computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32F.3d at 1583-84, 32 USPQ2d at 1035. See Interim Guidelines on 35 USC 101, Annex IV (a): Functional Descriptive Material.*

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claim 1, 2, 7-10, 15-17, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al ("A Space-Frequency Transmitter Diversity Technique for OFDM Systems", Globecomm 2000, IEEE Global Telecommunications Conference, November 27, 2000).**

Re claim 1, Lee discloses a method comprising:

receiving content for transmission (X(m) in fig. 2) via a multicarrier wireless

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communication channel (abstract. It is well known in the art that OFDM is a multicarrier transmission method); and

generating a rate-one (equation (1) on pg. 1474), space-frequency code matrix (matrix  $G_2$  on pg. 1474) from the received content ( $X(m)$  in fig. 2) for transmission on the multicarrier wireless communication channel from a plurality of transmit antennae ( $Tx_1$  and  $Tx_2$  in fig. 2).

Re claim 2, Lee discloses a method wherein the received content is a vector of input symbols of size  $N_c \times 1$  (pg. 1474, right column, first paragraph), wherein  $N_c$  is the number of subcarriers of the multicarrier wireless communication channel (equation (1),  $X_0(n)-X_1^*(n)\dots X_{n-2}(n)-X_{n-1}^*(n)$  and  $X_1(n)\dots X_{n-2}^*(n)$  are interpreted to be corresponding to the number of subcarriers).

Re claim 7, the modified invention of Lee teaches a method wherein the space-frequency matrix provides  $M \times N \times L$  channel diversity (pg. 1477, section V in Lee. Two-branch SF-OFDM transmitter diversity), while preserving a code rate of 1 for any number of transmit antenna(s)  $M$ , receive antenna(s)  $N$  and channel tap(s)  $L$  (pg. 1477, section V in Lee. Unity coding rate is interpreted as a code rate of 1).

Re claim 8, it would be inherent to have a storage medium comprising content to implement the method as claimed in claim 1.

Re claim 9, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 1. It would be inherent to have an apparatus to perform the method as claimed in claim 1.

Re claim 10, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 2.

Re claim 15, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 7.

Re claim 16, Lee discloses a system comprising:  
a number  $M$  of omnidirectional antennas ( $Tx_1$  and  $Tx_2$  in fig. 2); and  
a diversity agent, to receive content for transmission via a multicarrier wireless communication channel ( $X(m)$  in fig. 2. It would be inherent to have a receiver to receive the symbol), and to generate a rate-one (equation (1) on pg. 1474), space-frequency code matrix (matrix  $G_2$  on pg. 1474) from the received content for transmission on the multicarrier wireless communication channel from at least a subset of the  $M$  omnidirectional antennas antennae ( $Tx_1$  and  $Tx_2$  in fig. 2).

Re claim 17, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 2.



Re claim 22, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 7.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 3,11, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al ("A Space-Frequency Transmitter Diversity Technique for OFDM Systems", Globecom 2000, IEEE Global Telecommunications Conference, November 27, 2000) as applied to claim 1 above, and further in view of Wei (US5559561).**

Re claim 3, Lee teaches a method wherein the element of generating a rate-one space frequency code matrix comprises:

dividing the vector of input symbols (pg. 1474, right column, first paragraph. Data symbol vector  $X(n)$  ) into a number  $G$  of groups to generate subgroups (equation (1),  $X(n)$  divided into  $X_1(n)$  and  $X_2(n)$  ); and

However Lee fails to teach multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number  $G$  of pre-coded vectors ( $V_g$ ).

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Wei teaches using a Tomlinson precoder (precoder 17 in fig. 1) which outputs a sequence of values (col. 3 lines 51-54, the sequence is interpreted to be a vector). It is well known in the art that a Tomlinson precoder is a constellation precoder.

Therefore taking the combined teachings of Lee and Wei as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the precoder of Wei into the method of Lee. The motivation to combine Wei and Lee would be to compensate in advance for forced intersymbol interference (col. 3 lines 47-50).

Re claim 11, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 3.

Re claim 18, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 3.

**5. Claims 4-6, 12-14, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al ("A Space-Frequency Transmitter Diversity Technique for OFDM Systems", Globecom 2000, IEEE Global Telecommunications Conference, November 27, 2000) and Wei (US5559561) as applied to claim 1 above, and further in view of Hottinen et al (US20050078761).**

Re claim 4, the modified invention of Lee teaches a method further comprising:

dividing each of the pre-coded vectors into a number of  $LM \times 1$  subvectors (fig. 2 in Lee, the symbol vector  $X(m)$  is divided into  $X_1(n)$  and  $X_1(n)$  after encoding); and

However the modified invention of Lee fails to teach creating an  $M \times M$  diagonal matrix  $D_{sg,k} = \text{diag}[\Theta_{M \times (k-1)+1}^T S_G, \dots, \Theta_{M \times k}^T S_G]$ , where  $k=1 \dots L$  from the subvectors.

Hottinen teaches creating a diagonal transmission code matrix from transmit diversity code matrices (§0034). The code matrices  $X_1$  and  $X_2$  are interpreted to be subvectors.

Therefore taking the modified teachings of Lee and Wei with Hottinen as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the diagonal code matrix of Hottinen into the method of Lee and Wei. The motivation to combine Hottinen, Wei and Lee would be to increase performance and symbol rate in a wireless mobile system (abstract).

Re claim 5, the modified invention of Lee teaches a method further comprising: interleaving the  $L$  submatrices (pg. 1474, right column, second paragraph in Lee.  $X_e(n)$  and  $X_o(n)$  are interpreted to be the submatrices) from the  $G$  groups (pg. 1474, right column, first and second paragraphs in Lee.  $X_1(n)$  and  $X_2(n)$  are interpreted to be the groups. Furthermore,  $X_e(n)$  and  $X_o(n)$  are component vectors of  $X(n)$  ) to generate an  $M \times N_c$  space-frequency matrix (matrix  $G_2$  on pg. 1474 in Lee).

Re claim 6, the modified invention of Lee teaches a method wherein the space-frequency matrix provides  $M N L$  channel diversity (pg. 1477, section V in Lee. Two-branch SF-OFDM transmitter diversity), while preserving a code rate of 1 for any

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number of transmit antenna(s) M, receive antenna(s) N and channel tap(s) L (pg. 1477, section V in Lee. Unity coding rate is interpreted as a code rate of 1).

Re claim 12, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 4.

Re claim 13, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 5.

Re claim 14, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 6.

Re claim 19, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 4.

Re claim 20, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 5.

Re claim 21, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 6.

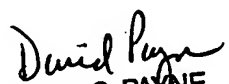
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon-Viet Q. Nguyen whose telephone number is 571-270-1185. The examiner can normally be reached on monday-friday, alternate friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Nguyen/

  
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SUPERVISORY PATENT EXAMINER